

REMARKS

After the foregoing amendment, claims 1-5 and 7-14, as amended, are pending in the application. Claims 1, 4, 9, 11 and 12 have been amended to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 6 has been canceled. Claim 14 is new. Applicants submit that no new matter has been added to the application by the Amendment.

Claim Objections

The Examiner has rejected claims 9, 10 and 11 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants have amended claims 9 and 11 to place them in proper dependent form. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to claims 9, 10 and 11.

Rejection - 35 U.S.C. § 102

The Examiner rejected claims 1-3, 12 and 13 under 35 U.S.C. § 102 as being unpatentable over U.S. Patent Application Publication No. 2004/0027940 A1 (hereinafter referred as "Minamino et al."). Applicants respectfully traverse the rejection.

In a conventional PLL, employing a phase detector and a frequency divider in a single control loop, if the initial frequency difference between the signals compared by the phase detector is large, the time to achieve phase locking is extended.

The present invention provides rapid phase locking while minimizing jitter by providing two control loops, L1 and L2. In the present invention, if the phase difference between the two signals to be compared by the phase comparator is relatively big, the feedback control loop L1 carried out by the same components as those of the conventional PLL clock generator is replaced by the components of feedback control loop L2. In the feedback control loop L2, the phase of the output signal of the frequency divider is controlled directly and there is no need to change the characteristic of the charge pump or low pass filter within the loop L1. An advantage of directly controlling the divider is that the capture range of the PLL is expanded. Consequently, the low pass filter in the loop L1 can be optimized for minimizing the jitter of the wobble clock signal simultaneously with reducing the lock up time.

Minamino is directed to an apparatus for recording modulated data on a rewritable storage medium. Fig. 15 is a block diagram of the PLL circuit used in Minamino's apparatus. As described at paragraphs [0150] to [0161], the PLL includes a phase comparator 242, a low pass filter 244, a VCO 245, a frequency divider 246 and a frequency shifter 250 at the output of the frequency divider. As described at paragraphs [0160]-[0161] and shown in Fig. 15, the phase shifter 250 shifts the phase of the output signal of the frequency-divided clock in accordance with the addition correction amount signal, which is the difference between the input wobble signal and the pre-pit signal.

Amended claim 1 recites, *inter alia* A PLL clock generator for generating an output signal, ... comprising a phase comparator for detecting a phase difference between the input signal and the output signal of the frequency divider so as to output a phase difference signal including information representing the phase difference; and a phase shifter for controlling the frequency divider in accordance with the phase difference signal so as to change the phase of the output signal of the frequency.

Amended claim 1 differs from Minamino's apparatus in two respects:

1. In Minamino's apparatus, the phase of the output signal of the frequency divider is changed by the addition of a phase shifter 250 at the output of the frequency divider and is not changed by the output of the phase shifter being applied to and controlling the frequency divider itself.

2. In Minamino's apparatus, the phase shifter 250 changes the phase of the frequency divider output signal based on comparing the phase difference between the input wobble signal and the pre-pit signal generated by the phase difference comparator 247. In contrast, amended claim 1 recites changing the phase of the frequency divider output signal based on "the phase difference signal", which is the difference between the input signal and the output signal of the frequency divider.

Applicants submit that Minamino does not anticipate amended claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §102 rejection of claim 1.

Further, it is respectfully submitted that since claim 1 has been shown to be allowable, claims 2-3 dependent on claim 1 are allowable, at least by their dependency.

Accordingly, for all the above reasons, Applicants respectfully request reconsideration and withdrawal of the § 102 rejection of claims 2-3.

Claims 12 and 13 are allowable for the same reasons that claims 1-3 are allowable. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §102 rejection of claims 12 and 13.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 7 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent Application Publication No. 2004/0027940 A1 (hereinafter referred as “Minamino et al.”) in view of Applicants admitted prior art of Fig. 7. Applicants respectfully traverse the rejection.

Claim 7 depends from claim 1. Fig. 7 does not disclose the limitations of claim 1 that made claim 1 allowable. Since claim 1 has been shown to be allowable, claim 7 dependent on claim 1 is allowable, at least by its dependency. Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 103 rejection of claim 7.

Rejection - 35 U.S.C. § 103

The Examiner rejected claims 4-6 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,236,629 (Hisakado et al.) in view of U.S. Patent Application Publication No. 2004/0027940 A1 (hereinafter referred as “Minamino et al.”), or U.S. Patent Application Publication No. 2003/0002406 (Deguchi et al.) or U.S. Patent No. 7,012,865 (Deguchi et al.) Applicants respectfully traverse the rejection.

Claim 4 has been amended to depend from claim 1. Claim 5 depends from claim 4. Neither Hisakado et al. nor Deguchi et al. teach or suggest a phase shifter for controlling the frequency divider in accordance with the phase difference signal so as to change the phase of the output signal of the frequency divider as recited in amended claim 1.

Since neither Hisakado et al. nor Deguchi et al. teach or suggest the limitations of claim 1 that made claim 1 allowable, claims 4-5 dependent on claim 1 are allowable, at least by their dependency. Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 103 rejection of claims 4-5.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 8 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,236,629 (Hisakado et al.) in view of U.S. Patent Application Publication No. 2004/0027940 A1 (hereinafter referred to as “Minamino et al.”), or U.S. Patent Application Publication No. 2003/0002406 (Deguchi et al.) or U.S. Patent No. 7,012,865 (Deguchi et al.) and further in view of Applicants admitted prior art. Applicants respectfully traverse the rejection.

Claim 8 depends from allowable claim 4 which in turn depends from allowable claim 1. Neither Hisakado et al. nor Deguchi et al. nor Applicants admitted prior art teach or suggest a phase shifter for controlling the frequency divider in accordance with the phase difference signal so as to change the phase of the output signal of the frequency divider as recited in amended claim 1.

Since neither Hisakado et al. nor Deguchi et al. nor Applicants admitted prior art teach or suggest the limitations of claim 1 that made claim 1 allowable, claim 8 dependent on claim 1 is allowable, at least by its dependency. Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 103 rejection of claim 8.

Claims 9-11

Claims 9-11 have been amended to include the limitations of claim 1 that made claims 1 and 7 allowable, i.e. a phase shifter for controlling the frequency divider in accordance with the phase difference signal so as to change the phase of the output signal of the frequency divider. Claim 10 depends from claim 9. Consequently, claims 9-11 are allowable for the same reasons that claims 1 and 7 are allowable. Accordingly, Applicants respectfully request reconsideration and withdrawal of the § 103 rejection of claims 9-11.

Conclusion

Insofar as the Examiner's objections and rejections have been fully addressed, the instant application, including claims 1-13, is in condition for allowance and Notice of Allowability of claims 1-13 is therefore earnestly solicited.

Respectfully submitted,

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(Date)

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